The Migratory Connectivity Project

What is Migratory Connectivity? It is the geographic linking of individuals and populations between one life cycle stage and another, for example between breeding and wintering locations for a migratory bird. Most animal groups have species that carry out some form of migration, birds being the most familiar example. Each year upwards of 5 billion birds worldwide migrate to their breeding or wintering grounds, stopping along the way to eat, rest, or find cover. For mammals we think of whales migrating across hemispheres, or wildebeest migrations on African plains. Not all migrations are seasonal or distant. Some species like salmon migrate only once, while species like salamanders and frogs migrate to vernal pools just for breeding.

The problem? **We do not adequately understand migratory connectivity.** At present, we know year round geographic ranges for many species but not the migratory routes taken by individuals or populations nor their endpoints. Thus we do not understand the factors that harm or reduce animal populations. For example, experts agree that multiple aspects of the complex ecology and evolution of migratory birds are likely being affected by climate change. Scientists are now challenged to identify, quantify and ultimately forecast how climate change will affect the biology of species. Without this information, adaptation or other conservation investments might be ineffective because they are at the wrong place, time or purpose.

Who cares? **Every aspect of society from the public to international coalitions need information on migratory connectivity.** Why? Because understanding migratory connectivity is key to species survival, mitigating the impacts of environmental challenges as large as climate change or a devastating oil spill, to as small as a housing permit. It directly impacts quality of life by predicting and addressing spread of diseases (human and animal), bird collisions with aircraft, positioning alternative energy structures and many other human development options. It can mean the difference between saving or losing an endangered species

What can we do? **New scientific tools and techniques allow for unprecedented levels of data collection, analysis, and modeling of animal movement.** Use of satellite transmitters, geolocators, stable isotope analysis and genomics are advancing our ability to track animals throughout the annual cycle, while remote sensing at local to continental scales allows us to detect environmental changes that may be driving movement. With the right resources and tactical leadership, these developments will improve knowledge of animal movements and their life cycles over the next decade and beyond.

The Migratory Connectivity Project is an initiative to conduct comprehensive life cycle analyses for wildlife, pushing forward the science of animal movements and connectivity by: 1) Advancing the use of current technologies and facilitating development of new technologies to increase the understanding of migratory connectivity. 2) Studying migratory connectivity and seasonal interactions at multiple temporal and spatial scales. 3) Integrating the use of migratory connectivity knowledge (data, models, analyses) to make it available to environmental managers and policy makers for informed decision making. 4) Working among government agencies and with a suite of public and private partners to accomplish these tasks. 5) Educating the public about migratory connectivity and international conservation. For further information, contact Dr. Peter Marra, Smithsonian Institution (marrap@si.edu) or Dr. Susan Haig, U.S. Geological Survey (haig_susan@usgs.gov).